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Study on development difference of Mao 11 and Mao 10 blocks

Lu chunong, Ma shizhong, Zhong dan
College of earth science of Northeast Petroleum University, Daqing, Heilongjiang, China.

***Corresponding Author:**
Zhong dan
Email: zhanglia_5859@qq.com

Abstract: Compared the production of Fuyu oil layer in the Toutai oil field, it is found that there are significant differences between the two adjacent blocks in the Toutai oil field: Mao 10 and Mao 11. To solve this problem, the development degree and heterogeneity of sandstone (thickness of sandstone and effective thickness, physical property, reservoir) and water flooding of two blocks are studied. To a certain extent, according to the results of the study can solve the problem of the development of the two blocks.

Keywords: Fuyu oil, difference, sandstone, heterogeneity, water flooding.

DISCOVERY OF THE QUESTION

The two adjacent blocks have different production. M11 block monthly oil production was significantly higher than the M10 block; M10 is high inthe first two months, then suddenly dropped and slowed down to a stable production. The during time ofthe high production ofthe M11 block is longer than that of the M10 block, and the production is generally slow down to a stable production.

STUDY OF THE QUESTION

Study on the development degree of sand bodies of Mao 11 block and Mao 10 block

According to Mao10, Mao 11 sandstone thickness and pure effective sandstone thickness from FI, FII, FIII three reservoir group of contour map (Figure 2-1, 2-2) can be analysis that Mao 11 Block FII sandstone development degree including sandstone distribution area and sandstone thickness range was better than those of the Mao 10 block.

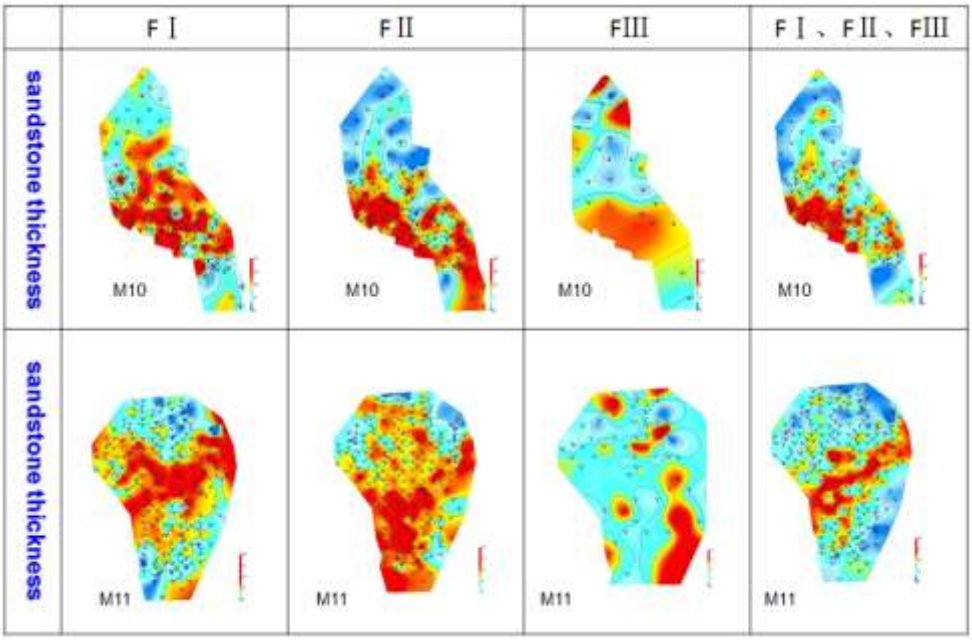

Fig: 2.1 sandstone thickness histogram of Mao 10 and Mao 11 blocks

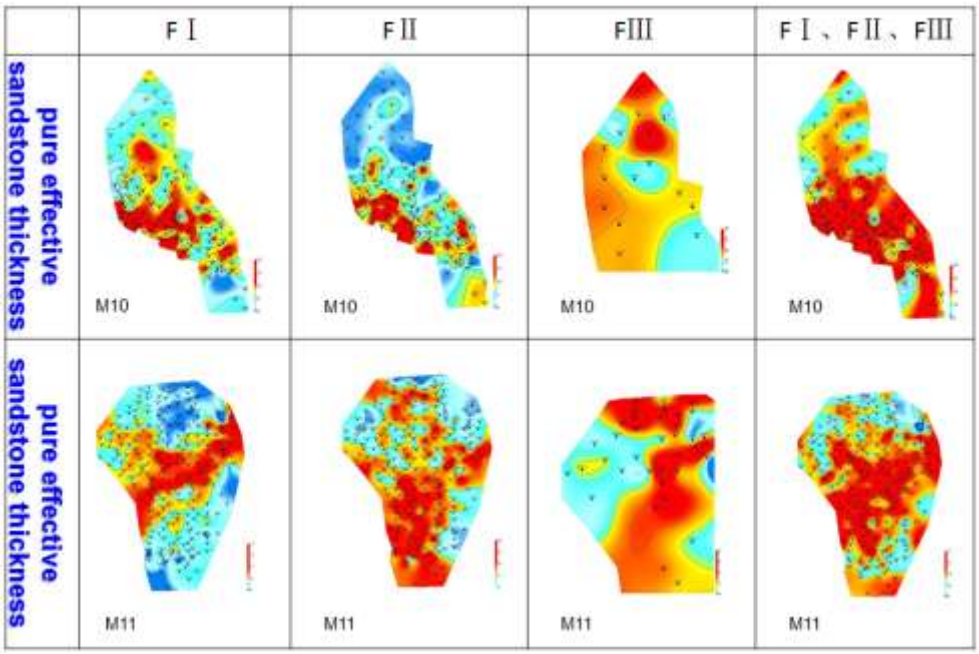

Fig: 2.2 pure effective sandstone thickness histogram of Mao 10 and Mao 11 blocks

The sandstone thickness of per unit area is the ratio of the total thickness of each layer and the Mao 10 ， Mao 11 block area [1]. The parameter can objectively and accurately evaluate the area developmental situation and differences of the sand bodies in the two research area. Comprehensive analysis of Mao and Mao 11 per unit area sandstone thickness can be seen in the main reservoir: FI5a, fI6A, fII1a, fII1b, fII1c, especially fII1b, Mao11 blocks sandstone development were better than Mao 10 block.

Study on the heterogeneity of Mao 11 and Mao 10

Interlayer heterogeneity study object are many small layer, which refers to the different sand vertical difference of degree [2], belong to group size and physical properties of reservoir description, including sandstone development degree and sandstone physical property and other aspects, the interlayer heterogeneity to divided layer, established development plan, tapped interlayer remaining oil has important significance. In this study of the heterogeneity of reservoir in Fuyu oil layer is characterized by the thickness of sandstone, the thickness of effective sandstone, porosity and permeability. The comparison of the heterogeneity of the layers is effective to judge the difference of sand body development in the development zone [3].

- Sandstone thickness and effective sandstone thickness comparison

Sandstone thickness and effective sandstone thickness analysis shows that whether Mao 11 nor Mao 10 block, the fI reservoir bottom and the fII reservoir tophave well developed sand stone thickness, of which, Mao 11 block layers of sandstone thickness that have well developed is: fI8a, fII1b, fII1c and fII 2a, Mao 10 block sandstone thickness is: fI8a, fI8b, fII1b and fII1C. The average thickness of the Mao 11 block sandstone is 97.49 meter, the average effective sandstone thickness is 68.96meter. The average thickness of the Mao 11 block sandstone is 98.23meter, the average effective sandstone thickness is 72.18meter, two blocks thickness of sandstone and effective sandstone have litter difference.

- Average porosity and average permeability

Analysis of Mao10, Mao 11 porosity and permeability, in the areas, fII reservoir physical property is the best, then is fIreservoir, and fIII reservoir is the worst. The layer that have better physical property: FI5A, fI8a, fII2A. The average permeability of the Mao 10 block is 1823.34 (10-3μm2, and the Mao 11 block is 2311.07 （10-3μm2. The average porosity of the 10 block is 11.73%, and the Mao 11 is 12.38%. So the physical properties of the Mao 11 block are better than that of the Mao 10 block [4].

- Mao 11, Mao 10 reservoir contrast research

According to the main reservoir layer (Figure 1-6) study, Mao 11 block reservoir layer is better than that of the Mao 10 block, mainly reflected in Mao 11 block channel distribution range is larger than the Mao block 10. The distribution of Mao 11 block sand bodies was significant larger than that of the Mao 10 block, and the physical property of the Mao 11 block was better than that of the Mao 10 block.

Study on water flooding of Mao 10 and Mao 11

Water flood recovery is not a simple piston type of uniform propulsion, but will follow the rock with large porosity and permeability [5]. From this aspect, it can be speculated that the larger the water flooded area is

and the better water flooded level is, the better the reservoir physical property is.

According to the water flooded of the main source rocks in the develop areas (Figure 2-3, 2-4) [6], main layers is fI5a,fI6a, fI8a, fII1b and fII1C: in fI5a , the First In fill Well Pattern and the second In fill Well Pattern have not large water flooded areas, the two develop zone has no obvious difference; in fI6A,only Mao 11 block have water flooded situation; in f I 8A, the second Infill Well Pattern can shows obviously the area of Mao 11 block water flooded areas is large than Mao 10 block; as same as FII1b and FII1c shows obviously, and Mao 11 block water flooded level is better than the Mao 10block, that is high flood or middle flood distributive areas are large [7].

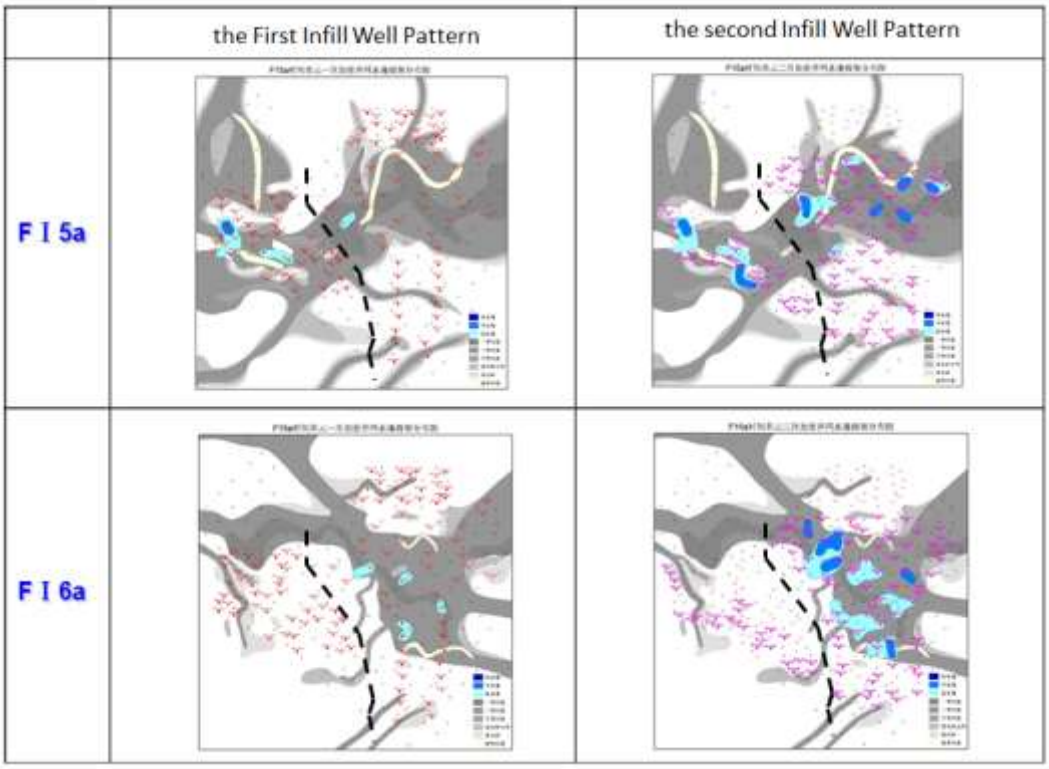

Fig- 2-4: FII1C water flooded

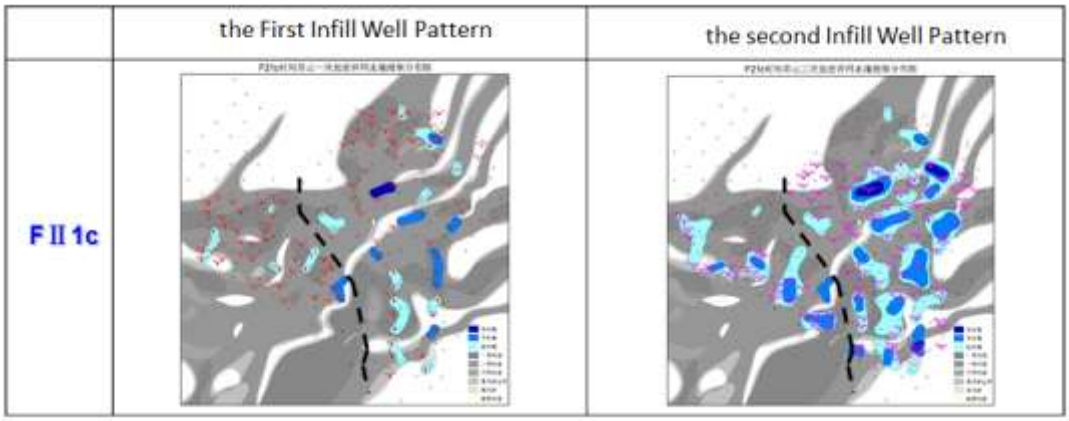

Fig-2-3: FI5a, FI6a water flooded

In summary, Mao 11 block water flooded areas and flooded sectors are better than Mao 10 block, that is to say from the aspects of water flooded, Mao 11 block reservoir sand stones are better than the Mao 10 block.

CONCLUSION

Through this modeling work, but also get following understanding:

- In terms of reservoir sandstone thickness, Mao 11block is better than the Mao 10 block, especially in the F II 1b, F II 1C two main oil reservoir;
- In porosity and permeability, Mao 11 block is better as same as before the block 10 block;
- the Mao 11 block have more river distribution areas than Mao 10 block,
- Mao 11 block water flooding level and flooding area is larger than the Mao 10 block, so it can be inferred that the physical properties of Mao 11

block is better than that of Mao 10 block.

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